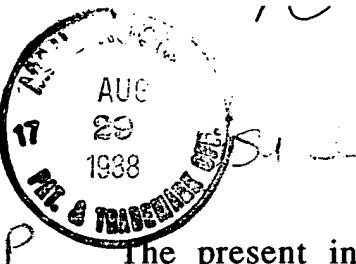




UNITED STATES PATENT SPECIFICATION

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TITLE: AUTOMATIC CENSORSHIP OF VIDEO PROGRAMMES



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FIELD OF THE INVENTION

P The present invention relates to methods of, and apparatus for,
B automatic censorship of video ^{programs} ~~programmes~~. The term video
B programme used hereinafter refers to television ^{programs} ~~programmes~~
broadcast free-to-air or by cable or by satellite, and other forms
B of mass distribution of video ^{programs} ~~programmes~~, including distribution
by video tape or other media. The term also includes an
10 accompanying audio signal if any.

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BACKGROUND OF THE INVENTION

P The need for censorship of video material is generally accepted
by most societies, for the purposes of preventing the viewing of
material by persons other than the target audience. Usually, such
censorship takes the form of limiting access of a certain group of
people, for example children, to a certain class of material, for
example pornographic or violent movies. Other uses of censorship
20 include voluntary self-censorship in cases where a recipient of a
B programme does not wish to be exposed to certain types of
B programme, for example scenes of great violence, advertisements
B which may be considered offensive, or non-programme material
which interrupts movies, drama or sports broadcasts.

Being the most widely accessible form of broadcasting,
television is the medium with which the problem of censorship is
experienced most. Traditionally, censorship of television takes
the form of either preventing possibly offensive material from
being broadcast in the first place, or voluntary self-censorship,
30 that is, switching off the receiver when material which the
viewer does not wish to experience is being broadcast. Another
form of self-censorship, which has gained popularity since the
introduction of remote controls for television sets is the
phenomenon known as "zapping". Zapping involves eliminating
unwanted material by muting the receiver or changing channels
for the duration of the unwanted segment. While such self-
censorship offers the benefit that all classes of material remain
available to those who do not find them objectionable, it suffers
from the inconvenience of having to anticipate the nature of

broadcasts and operate the receiver appropriately. This process is tedious and error-prone, especially where the viewer wishes to
B suppress programme material which changes rapidly in nature,
for example when the viewer desires to suppress commercial
B messages within an otherwise unobjectionable programme.
Manual censorship is therefore not an entirely satisfactory
solution.

It is therefore desirable to provide means whereby display of
B preselected classifications of programme material can be
10 automatically suppressed.

Arrangements for automatic censorship have been previously published, but suffer from a number of serious shortcomings. The main difficulty is that automatic means for discrimination of
B different programme classifications, for example detection of television commercials, have been complex and unreliable. One technique has been to detect television commercials by the short period of black picture and silence separating them from other
B programme material. A typical commercial-deleter of this type is
B described in United States patent number 4,319,286. This system
20 and others like it suffer from the problem that erroneous operation occurs if there is a brief period of black and silence in a broadcast at a time other than at the beginning of a commercial break, or if there is no separation between commercials and other programme material. Furthermore, such systems are
B unable to distinguish between resumption of desired programme and further commercials at the conclusion of a commercial.
Resumption of viewing or recording must therefore be controlled by some form of timing device, based on assumptions regarding the length of commercial breaks. If these assumptions are not
30 correct, the system will fail in its function.

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A much improved censorship means is described in United States Patent number 4,520,404. This system relies on a human operator to classify broadcasts, based on observation at a monitoring station. A suitably coded message is distributed from the monitoring station to the viewer's home, at which point a suitably-equipped decoder controls the television receiver or video recorder in accordance with the classification data generated by the human operator at the monitoring station. Although this invention significantly improves upon the

reliability of previous methods, it nevertheless suffers significant limitations. One limitation is the difficulty of accurately predicting at the monitoring station when a change of programme is going to occur, making the system somewhat error prone. Another limitation is that when the system is used under the control of one party to control the viewing of another party, for example used by parents to limit viewing by children, it is necessary to provide control means by which the class of programme to be censored can be selected, and it is therefore possible for the other party to use these controls to disable the censorship, thereby defeating the function of the system. Yet another limitation is that during the period that unwanted material is being censored, the receiver is simply disabled. The viewer is therefore periodically presented with a blank screen and/or silence, which may have the undesirable effect of causing alarm when programme suddenly resumes, or may be mistaken for a receiver malfunction.

The prior art methods are also deficient in that they do not provide means whereby an ^{authorized} person can selectively disable viewing of certain classifications of pre-recorded video programmes.

SUMMARY OF THE INVENTION

The present invention is directed to providing novel and improved means and method of receiving video programmes whereby the censorship function is provided automatically, substantially resolving the abovementioned shortcomings of the prior art as well as providing other benefits.

According to a first aspect of the present invention, there is provided a video programme receiving method capable of automatically censoring video programmes comprising the steps of receiving a video programme, with accompanying audio if any, receiving a classification signal indicative of the content of the programme being received, decoding the classification signal and, according to functions selected by the user, causing the receiver to direct to its output alternative programme material for the duration of programme of selected classification.

- According to a second aspect of this inventive concept, apparatus for receiving and automatically censoring video programmes is also provided, and comprises a video programme receiver, a classification signal receiver, a controller equipped to decode said received signal and to control switching means which, according to functions selected by the user at the receiving station, cause the receiver to direct to its output alternative programme material for the duration of programme of selected classification.
- 10 The term "receiver" used herein is defined in the broad sense of apparatus for converting television signals (and their associated sound signals) into visual and audible signals, or apparatus for converting modulated carrier signals into video and/or audio signals suitable for display by video monitors or audition via amplifiers and loudspeakers. For example, the term receiver includes off-air domestic television sets, as well as apparatus known commonly as a "video monitor". The term "receive" is used in the broad sense of accepting signal from any signal conveyance means, for example, from an antenna, cable, optical fibre, magnetic tape, or optical disk.
- 20 Some embodiments of this invention also include an arrangement for enabling access to selection of classifications to be censored only upon entering of a security code, or personal identification number (PIN), by the user.

BRIEF DESCRIPTION OF THE DRAWINGS

Some embodiments of the present invention will now be described, by way of example only, with reference to the drawings in which:

Fig. 1 is a schematic block diagram of a first embodiment of the invention in which the programme classification is encoded into the vertical interval of the video signal;

Fig. 2 is a schematic diagram of the operational loop of the programme executed by the microcomputer of the first embodiment;

Fig. 3 is a schematic diagram of the software used in either embodiment for setting classifications;

Fig. 4 is a schematic diagram of the software used in either embodiment for overriding the censorship function; and

B Fig. 5 is a schematic block diagram of a second embodiment of the invention in which the programme classification is received by the invention from a transmission source other than the programme to be censored.

DETAILED DESCRIPTION

As seen in Fig. 1 this embodiment of the invention comprises the conventional components of a television receiver or monitor, including audio amplifier 11, loudspeaker 12, CRT driver 10 and CRT 13. Under normal conditions, the sources of video and audio are selected from video input 3 and audio input 1 respectively.

B However when ^{the selector means energized} relay 7 is energised, alternate audio input 2 and alternate video input 4 are selected instead. Both sets of audio and video inputs may derive from any source, for example a television tuner or video tape player.

The operation of this embodiment relies on the presence of a programme classification code within the video signal. This can be provided in a number of well known ways which ensure that the presence of such codes do not interfere with the normal operation of television receivers. The method used in this embodiment is encoding of a digital word in the form of black and white transitions located on line 16 of the video signal. This position is chosen so as to be invisible on the CRT display. The technology for this form of signalling is well known, being commonly used for data broadcasting services such as Teletext. The classification may be pre-recorded on tapes being broadcast or played locally, or inserted in a video signal prior to transmission at the broadcasting station at the time of broadcast. The means for inserting such signals is well known.

Upon arrival at video input 3 of the invention, as well as being fed to the display system, the video portion of the programme is fed to line code extractor 5, which comprises means for isolating the desired line (in this embodiment line 16), extracting the digital word from that line, and presenting it as an output readable by microcomputer 6.

Microcomputer 6 is a self-contained "single chip computer" including RAM, ROM, IO ports, CPU and NV (non-volatile)

memory. Of course, microcomputer 6 may also perform many other functions required by the receiver, as well as those of this invention. One of the output ports of microcomputer 6 controls relay 7. Other ports read data from keyboard 8 and send data to display 9.

Keyboard 8 is a press-button key array, which contains keys for control of all the usual television functions, as well as special keys used by this invention. The special keys include a SET CLASSIFICATION key, used for entering the classifications to be censored, an OVERRIDE key, used to disable the censorship function, and a RESUME key, used to resume censorship after OVERRIDE. The usual channel selection keys of the receiver of this embodiment serve the double purpose of allowing the user to enter a PIN (personal identity number). Similarly, the other keys can serve double functions if desired.

Display 9 is used to signal the user as required. In this embodiment it comprises an eight character liquid crystal display. In other embodiments other forms of display can be used, including single LEDs, or a video character generator which causes characters to be superimposed on the CRT display.

The censorship function of the invention is performed by the arrangement of Fig. 1 executing the programme described schematically in Fig. 2.

Referring now to Fig. 2, the programme starts by scanning the keyboard to test for a key depression. If no key is pressed, the classification code, arriving from line code extractor 5, is read, and an address is generated as a function of the code. A table is stored in the RAM of microcomputer 6, the address of each data bit of the table corresponding to a unique classification code, and the state of each bit so addressed indicating the classification status, namely ENABLED or DISABLED. A set bit indicates DISABLED, while a clear bit indicates ENABLED. Having generated an address from the received code, microcomputer 6 then applies this address to the table, and tests the corresponding data bit. If the bit is set, relay 7 is energized, causing the video and audio signals to be switched to the alternate sources. If the bit is clear, relay 7 is released, with the opposite effect. This procedure is repeated as a loop at high speed, so that the operation of relay 7

follows instantaneous changes in classification codes arriving at the video input of the invention.

- B In order to allow ^{authorized} users to select whether a given classification code is to be enabled or disabled, the programme of Fig. 2 also continually scans the keyboard, testing for depression of the SET CLASSIFICATION key. If this key is pressed, the SET CLASSIFICATION routine is performed, according to Fig. 3.

Referring now to Fig. 3, when the SET CLASSIFICATION key has been pressed, microcomputer 6 first requests, via display 9, that 10 the user enter the PIN. A number is then input, in this embodiment three digits being used for security, and compared to the PIN stored in the NV memory of microcomputer 6. If the number does not match, the request is repeated. If the number does match, the first classification group number is displayed, and the user is requested to enter enable or disable, using two designated keys of keyboard 8. If enable is entered, the first bit of the code array is cleared. If disable is entered, the bit is set. A test is then performed to see whether the last element of the array has been programmed. If it has, control is returned to the 20 operational loop, if not, the next array element is addressed, and the input cycle repeated for the next classification code.

In this embodiment the array comprises three bits, corresponding to the classifications:

- Pw B
L B
R B
P 30 B
1. Advertisement (commercial product or service promotion)
 2. Non-programme material (includes advertisements, station identification, community service announcements, commentary during movies etc.)
 3. Restricted. Programmes deemed by the government censors to be unsuitable for viewing by children.

The coding scheme of this embodiment uses an eight bit word, so that up to 256 classifications can be supported. The 253 unused bits of the array are cleared, so that all classifications other than the three listed above are always enabled. If desired, this range of classifications can be extended greatly, by increasing the size of the memory array.

- B When an ^{authorized} person, for example a parent, desires to B watch a programme of disabled classification, it may be inconvenient to re-define the classifications enabled. For convenience, this embodiment provides an override function,

which is invoked by pressing the OVERRIDE key of keyboard 8. Depression of this key is detected by the test in the operational loop of Fig. 2, and results in the execution of the override routine of Fig. 4.

Referring to Fig. 4, on entry to the override routine, the PIN is requested from the user. If the PIN does not match the number stored in NV memory, the routine terminates. If the correct PIN has been entered, relay 7 is released, and the programme continues looping until the RESUME key is pressed, with the result that no censoring action occurs until the RESUME key is pressed.

A second embodiment of the invention is shown in Fig. 5. This embodiment is similar to the first embodiment, except that classification codes are received from a source separate from the source of video programme. In this case, classification receiver 14 is provided to receive classification signal input 15, which can arrive from any source, for example a radio transmitter distinct from the transmitter broadcasting the video programme. This embodiment of the invention is not suited to operation with pre-recorded tapes as programme source. Operation of this embodiment is the same as the first embodiment, except that classification codes are read from classification receiver 14, rather than line code extractor 5, by microcomputer 6. The software executed by microcomputer 6 is also the same. The capabilities of both embodiments could easily be combined.

The foregoing describes only some embodiments of the present invention and modifications, obvious to those skilled in the art, can be made without departing from the scope of the present invention.

For example, in cases where a broadcast programme is being viewed, more than one channel of broadcast is available, and the classification signal is being received ^{from} a source other than the broadcast being received, it is desirable that each classification code received be identified as relating to a particular channel, so that censorship can be based on which channel is being viewed or recorded. This feature is easily added to the embodiments described, especially in cases where the

keyboard and microcomputer of the invention are also used to control the channel selection functions of the television receiver.

For the purpose of implementing the invention without needing to modify the television receiver, the invention can comprise a standard television receiver in combination with a special controller which controls operation of the receiver by means of the remote control interface of the television receiver, if the receiver is equipped with remote control. That is, the censorship controller is equipped with interface means compatible with the remote control communication standard, for example an infra-red transmitter, so muting, blanking, channel-changing, or other censorship actions can be effected using unmodified receiving equipment. The channel-change function can provide the facility of displaying alternative material during periods of censorship. For example, a suitable pattern generator tuned to an unused television channel could be used to provide "electronic wallpaper" during commercial breaks. In some applications it may be desirable to implement some functions of the invention, such as PIN entry, in the remote controller, and other functions, such as the censorship function, in the receiver.

Whereas the switching means of the embodiments described herein is a relay, any form of suitable switch, such as a solid-state arrangement, can be used.

The alternative material selected during censorship periods can originate from a remote source, for example another television broadcast, or locally, for example from a video disk or tape player. The local source may also be simply a black signal generator. Furthermore, the invention is not limited to providing only one alternative programme source.

Whereas one embodiment of the invention described above relies upon signals encoded into the video portion of the received programme, the invention can also be effectively implemented using signals embedded into the audio portion of the programme, using any of the available well-known techniques which do not interfere with normal sound reception.